Microbiology 1996 vol.65 N1, pages 74-78

Dependence of the intensity of 2,4,6-trinitrotoluen--induced mutagenesis on the physiological state of Salmonella typhimurium tester strains

Il'Inskaya O., Ivanchenko O., Karamova N., Remizov A., Skvortsov A., Fishman A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The dependence of the mutagenic potential of 2,4,6-trinitrotoluene (TNT) on the growth phase of Salmonella typhimurium tester strains TA100 and TA98 is shown. The mutagenic potential proved to be maximal for log-phase cultures, being higher with strain TA100 than TA98. The amount of TNT absorbed by bacteria in the first minutes of contact varied depending on culture age and was the largest at the beginning of the exponential growth phase. A direct relation between the number of microbial cells and the amount of TNT absorbed from the medium was shown. The analysis of infrared (IR) spectra of cells after a 3-min contact with TNT demonstrated that, at physiological temperatures, 2.4% of the original amount of TNT was present in cells of the tester strain in an unaltered form, while, at a lowered temperature, this value was 10.3%. Thus, the retardation of physiological processes in the cell changes the intensity of mutagen absorption and transformation. It is emphasized that an accurate assessment of mutagenicity should take into account the physiological state of tester bacteria.